

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of)	
)	
Feasibility of Allowing Commercial)	
Wireless Services, Licensed or Unlicensed,)	GN Docket No. 18-122
to Use or Share Use of the Frequencies)	
Between 3.7 and 4.2 GHz)	
)	

COMMENTS OF MOTOROLA SOLUTIONS, INC.

Motorola Solutions, Inc. (“Motorola Solutions” or “MSI”) hereby files these comments in response to the Public Notice on the Feasibility of Allowing Commercial Wireless Services in the 3.7 and 4.2 GHz band.¹ Benefitting greatly from the developing eco-system of technology from the neighboring 3.55 – 3.70 GHz band,² this 500 MHz of spectrum can support innovative, next generation fixed and mobile broadband services for a wide variety of end users.

Motorola Solutions believes that the most expedient and highest efficiency use of the 3.7-4.2 GHz band can be obtained through the employment of spectrum sharing techniques. While some advocates are promoting re-locating and re-banding incumbents for a portion of the band,³ such an undertaking would be costly and time-consuming, and would delay the introduction of

¹ *Office of Engineering and Technology, International, and Wireless Telecommunications Bureaus Seek Comment for Report on the Feasibility of Allowing Commercial Wireless Services, Licensed or Unlicensed, to Use or Share Use of the Frequencies Between 3.7-4.2 GHz*, Public Notice, DA 18-446 (rel. May 1, 2018).

² The Citizen Broadband Radio Service (“CBRS”) is allocated use of the 3.55 – 3.70 GHz band. *See* 47 C.F.R. § 96.1 *et seq* of the Commission’s Rules. *See also, Promoting Investment in the 3550-3700 MHz Band*, Notice of Proposed Rulemaking and Order, GN Docket No. 17-258, 32 FCC Rcd 8071.

³ *See e.g.,* Comments of Nokia, GN Docket No. 17-183, Oct. 10, 2017; Letter from Mark Racek, Sr. Dir Spectrum Policy, Ericsson to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 17-183, March 29, 2018.

innovative wireless services by several years. In order for the U.S. to exercise global leadership in advanced broadband deployment, it is important to utilize this valuable spectrum for innovative broadband applications as soon as possible. A database driven approach, similar to that employed in the CBRS band, will result in the quickest deployment of services in the band while providing necessary protection to incumbent users. Both licensed (*e.g.*, priority access licensed) and unlicensed (*e.g.*, general authorized access) tiers should be supported in this model.

Sharing the band through database driven mechanisms will result in less impact to existing incumbent operations than relocation. Existing incumbents in the band can be adequately protected to appropriate levels similar to the approach used to protect the same incumbents in the CBRS proceeding.⁴ The incumbent users in the band are primarily satellite receive earth stations and, therefore, not as dynamic as the incumbent users of the CBRS band. Thus, daily access to spectrum sharing databases would be adequate to manage interference in the band. Such an approach can also accommodate changing uses in the band if and when portions of the band are cleared for broadband data uses. The use of satellite dish pointing angle and receiver filtering characteristics are essential to efficiently utilizing spectrum and protecting satellite receive station incumbents from harmful interference. Reasonable interference to noise protection ratios (*e.g.*, -6 dB I/N) can be utilized to protect non-critical incumbent users in the band.⁵ The use of beam-forming, other fixed or adaptive antenna techniques can also be taken into account to steer interference away from incumbent users in the band, and increase band utilization without harmful interference. Terrain and clutter effects should also be accurately modeled to provide more efficient spectrum utilization. The use of realistic propagation models

⁴ 47 C.F.R. § 96.17.

⁵ Motorola Solutions would support greater interference protection for incumbent facilities operated by Federal Government, public safety and critical infrastructure users.

(not solely Irregular Terrain Model-based such as Longley-Rice) should be utilized for more accurate interference prediction.⁶

An accurate registration database of actual incumbent usage characteristics in the band is imperative to successful sharing. Registered information should include incumbent location (e.g., FSS receiver dish location), antenna pointing angle, actively utilized frequencies, *etc.* Such a database can be dynamically updated to account for any changes in incumbent operation in the band over time. It is crucial that only actively operating links be contained in the registration database. Any public safety or critical infrastructure links should be automatically entered into the registration database. Such registration databases are vital for protecting incumbent operations in the band.

To accommodate a wide variety of broadband needs from various industrial and enterprise sectors in a database driven sharing approach, Motorola Solutions supports establishing service areas for Priority Access Licenses that are no larger than the size of counties, as is proposed in the 28 GHz auction.⁷ Smaller license areas would allow wireless Internet Service Providers to tailor broadband delivery to targeted markets in desperate need of broadband competition. General authorized access should be available as well, as such spectrum access will be important in those geographic areas that do not support high secondary system transmit power levels (due to incumbent interference protection constraints) or sufficiently wide 5G system channel bandwidths. This is especially true for indoor secondary uses in the band,

⁶ The ITU Irregular Terrain Model (Longley-Rice propagation model) generally neglects clutter effects, which can result in significant under-estimation of propagation losses. *See e.g.,* Comments of Google, GN Docket No. 12-354, filed Feb. 16, 2016.

⁷ *In the Matter of Use of Spectrum Bands Above 24 GHz For Mobile Radio Services, et al*, GN Docket No. 14-177, Second Report and Order, Second Further Notice of Proposed Rulemaking, Order on Reconsideration, and Memorandum Opinion and Order, FCC 17-152, 32 FCC Rcd 10988 (2017) at ¶¶ 166-168.

which will benefit from significant building penetration losses, greatly limiting their interference range.

A critical access tier for utility, critical infrastructure and industrial uses should also be made available, especially with available channel bandwidths of 20 MHz or less over more limited deployment areas that are not of primary interest to cellular providers. We think it will prove to be challenging to open up adequate spectrum for 5G services to accommodate a wide variety of broadband service providers in many areas.⁸ However, the availability of smaller channel bandwidths or smaller geographic regions for more limited secondary uses should still be accommodated, and can greatly benefit the economy. Finally, we support the use of multi-stakeholder groups, such as WinnForum, to develop low level operational details for the band. This approach has been utilized to develop several industry standards for operation in the CBRS band.

⁸ Some commercial wireless advocates have advocated opening three to four 100 MHz channels for commercial broadband services. *See* Letter from Mark Racek, Sr. Dir Spectrum Policy, Ericsson to Marlene H. Dortch, Secretary, Federal Communications Commission, GN Docket No. 17-183, March 29, 2018.

Motorola Solutions looks forward to the many opportunities that an additional 500 MHz of spectrum provides for innovative broadband systems, and encourages the Commission to employ an inclusive approach that involves all interests and stakeholders in the band. We urge the Commission to move expeditiously in this proceeding to make additional spectrum available for a wide variety of advanced broadband applications.

Respectfully Submitted,

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